

### **AMENDMENTS TO THE DRAWINGS**

The attached sheet of drawings includes changes to Fig. 7. This sheet, which includes Fig. 7-8, replaces the original sheet including Fig. 7-8. Fig. 7 has been amended to indicate features recited in the claims.

## **REMARKS/ARGUMENTS**

Initially, Applicant thanks the Examiner for discussing the presently pending patent application during telephone calls to the Examiner on June 2 and 5, 2006. In this reply, the specification, the drawings, and independent claims 1, 11, and 21 have been amended.

### **Rejections under 35 U.S.C. § 112**

In the Office Action, the Examiner rejected claims 1-4, 8-14, and 17-27 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and strictly claim the subject matter which the Applicant regards as the invention. In particular, the Examiner alleged that the claim limitations “a material reinforced with a matrix” and “wherein the material is a C-stage resin” as recited in independent claims 1, 11, and 21 rendered the claims indefinite because it is alleged that describing one element with two different terms renders the claim indefinite. Accordingly, claims 1, 11, and 21 have been amended to now recite “a C-stage resin reinforced with a matrix.” In view of the amendments, Applicant respectfully requests reconsideration of this rejection.

The Examiner further asserted that it is unclear how the phrase “periphery of the encapsulation material” relates to the claimed structure as recited in claim 21 (as well as in claims 1 and 11). Accordingly, claims 1, 11, and 21 have each been amended to clarify the subject matter of these claims and now recite the features “an encapsulation material encasing the first die, the encapsulation material having a form factor with a peripheral surface opposite of the die that intersects the first die side of the first carrier substrate” and the intermediate substrate “located external of the peripheral surface of the encapsulation material” or similar such features.

### **Rejections under 35 U.S.C. § 103**

The Examiner rejected claims 1-3, 7-9, 21, and 26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,828,665 to Pu et al. (“Pu”) in view of U.S.

Patent No. 6,507,102 to Juskey et al. ("*Juskey*"). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

In the Office Action, the Examiner alleged that the combination of *Pu* and *Juskey* teaches each and every feature of original claim 1. In particular, the Examiner appears to cite *Pu* for the proposition that *Pu* teaches substantially all of the features of original claim 1 except that *Pu* does not teach "a substrate having a solid core comprising a material reinforced with a matrix, wherein the material is a C-stage resin," but cites *Juskey* for the proposition that *Juskey* teaches a C-stage resin reinforced with matrix and that it would have been obvious to incorporate the teachings of *Juskey* into the device taught in *Pu*.

However, amended claim 1 has features that are not taught or suggested by *Pu* and/or *Juskey*. These features include, for example, "an encapsulation material encasing the first die, the encapsulation material having a form factor with a peripheral surface opposite of the die that intersects the first die side of the first carrier substrate" and "an intermediate substrate having a first side and a second side, the first side being directly coupled to the first die side of the first carrier substrate and located external of the peripheral surface of the encapsulation material, the second side being directly coupled to the second non-die side of the second carrier substrate, the intermediate substrate comprising of a substantially solid core having a first side and a second side, the substantially solid core comprising of a C-stage resin reinforced with a matrix to increase rigidity of the microelectronic packages and control the coefficient of thermal expansion of the intermediate substrate."

At best, the combination of *Pu* and *Juskey* only teaches to place an intermediate substrate 55 (metal pin) within the encapsulation material 56 and NOT "located external of the peripheral surface of the encapsulation material" as recited in amended claim 1. Further, one skilled in the art would not modify the teaching of *Pu* with the teaching of *Juskey* such that the intermediate substrate 55 (metal pin) of *Pu* comprises "a substantially solid core having a first side and a second side, the substantially solid core comprising of a C-stage resin reinforced with a matrix" as recited in claim 1 since the

intermediate substrate 55 (metal pin) of *Pu* is an electrically conductive interconnect. For at least these reasons, claim 1 is patentable over *Pu* in view of *Juskey*.

Amended independent claim 21 has features similar to those of amended claim 1 and therefore, is also patentable over *Pu* in view of *Juskey*. Claims 2, 3, 7-9, and 26 depend from claims 1 and 21, incorporating their features. Thus, claims 2, 3, 7-9, and 26 are also patentable over *Pu* in view of *Juskey*.

Claims 1-3, 7-9, 21, and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,878,571 to Isaak et al. ("*Isaak*") in view of *Pu* and *Juskey*. Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

In the Office Action, the Examiner alleged that *Isaak* taught all of the features of claim 1 including **an intermediate substrate 92** but acknowledged that *Isaak* does not teach an "encapsulation material encasing the first die such that the intermediate substrate is located along periphery thereof, wherein the material is a C-stage resin." See Office Action, page 6, lines 16-17, underline added. The Examiner, however, further goes on to allege that *Pu* teaches "an encapsulation material 56 (see figure 2e) encasing the first die 52" and that *Juskey* teaches an "epoxy resin material reinforced with a matrix (column 3, line 66 – column 4, line 9), wherein the material is a C-stage resin" and that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention was made to use an encapsulation material encasing the first die such that the intermediate substrate is located along periphery thereof, wherein the material is a C-stage resin, in Isaak et al.'s device in order to provide better protection to the die." See Office Action, page 6, line 19, to page 7, line 7, underline added. Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

As previously alluded to, claim 1 recites the features an "intermediate substrate comprising of a substantially solid core having a first side and a second side, the substantially solid core comprising of a C-stage resin reinforced with a matrix." Thus, claim 1 requires the intermediate substrate that is located external of the peripheral surface of the encapsulation material to be comprised of a C-stage resin reinforced with a matrix rather than the encapsulation material as asserted by the Examiner.

In addition, Applicant submits that *Isaak* specifically teaches an intermediate substrate (spacer sheets) 92 that is fabricated from a **particular type of material, paper**. See *Isaak*, col. 10, lines 35-37. Applicant further submits that one would not be motivated to modify the spacer sheets 92 of *Isaak* such that the spacer sheets 92 would be made from a C-stage resin because *Isaak* teaches that the spacer sheets 92 have specific characteristics such that they can be **“easily punched to form the openings 92”** and **be easily removable**, and as well known to those skilled in the art, C-stage resin is not easily “punchable” nor is it easily removable. See col. 10, lines 37-40 and lines 48-50 of *Isaak*. For at least these reasons, claim 1 is patentable over *Isaak* in view of *Pu* and *Juskey*.

Amended independent claim 21 has similar features as claim 1, and is, therefore, also patentable over *Isaak* in view of *Pu* and *Juskey*. Claims 2-3, 7-9, and 26 depend from claims 1 and 21, incorporating their features. Thus, claims 2-3, 7-9, and 26 are likewise patentable over *Isaak* in view of *Pu* and *Juskey*.

Claims 4 and 27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pu* and *Juskey* or over *Isaak*, *Pu*, and *Juskey*, and in further view of U.S. Patent No. 6,014,317 to Mark F. Sylvester (“*Sylvester*”). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

Claims 4 and 27 depend from and add additional features to independent claims 1 and 21, respectively. The deficiencies of *Pu* and *Juskey* or *Isaak*, *Pu*, and *Juskey* as described above as they relate to claims 1 and 21 are not overcome by the teachings of *Sylvester*. For at least this reason, claims 4 and 27 are patentable over *Pu* and *Juskey* or *Isaak*, *Pu*, and *Juskey*, in further view of *Sylvester*.

Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pu* and *Juskey* or over *Isaak*, *Pu*, and *Juskey*, and in further view of U.S. Patent Application Pub. No. 2004/0050586 to Hyoung-ho Roh (“*Roh*”). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

Claim 10 depends from independent claim 1, incorporating its features. The deficiencies of *Pu* and *Juskey* or *Isaak*, *Pu*, and *Juskey* as described above as they

related to claim 1 are not overcome by the teachings of *Roh*. For at least this reason, claim 10 is patentable over *Pu* and *Juskey* or *Isaak* and *Pu*, in further view of *Roh*.

Claims 11-13 and 17-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pu* and *Juskey* or over *Isaak*, *Pu*, and *Juskey*, and in further view of U.S. Patent No. 6,054,337 to Vernon Solberg ("*Solberg*"). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

Amended independent claim 11 has features similar to those of claims 1 and 21. Therefore, claim 11 is patentable over *Pu* and *Juskey* or *Isaak*, *Pu*, and *Juskey* as described above for claims 1 and 21. Further, the deficiencies of *Pu* and *Juskey* or *Isaak*, *Pu*, and *Juskey* as they relate to claims 1 and 21 as described above are not overcome by the teachings of *Solberg*. For at least this reason, claim 11 is patentable over *Pu* and *Juskey* or *Isaak*, *Pu*, and *Juskey*, in further view of *Solberg*.

Claims 12, 13, and 17-19 depend from claim 11, incorporating its features. Therefore, claims 12, 13, and 17-19 are also patentable over *Pu* and *Juskey* or *Isaak*, *Pu*, and *Juskey*, in further view of *Solberg*.

Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pu*, *Solberg*, and *Juskey* or over *Isaak*, *Solberg*, *Juskey*, and *Pu*, and in further view of *Sylvester*. Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

Claim 14 depends from independent claim 11, incorporating its features. Therefore, for at the same reasons that claim 11 is patentable over *Pu*, *Solberg*, and *Juskey* or over *Isaak*, *Solberg*, *Juskey*, and *Pu*, claim 14 is patentable over *Pu*, *Solberg*, and *Juskey* or over *Isaak*, *Solberg*, *Juskey*, and *Pu*. Further, the deficiencies of *Pu*, *Solberg*, and *Juskey* or *Isaak*, *Solberg*, *Juskey*, and *Pu*, as described above as they related to claim 11 are not overcome by the teachings of *Sylvester*. For at least this reason, claim 14 is patentable over *Pu*, *Solberg*, and *Juskey* or over *Isaak*, *Solberg*, *Juskey*, and *Pu*, and in further view of *Sylvester*.

Claim 20 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pu*, *Solberg*, and *Juskey* or over *Isaak*, *Solberg*, *Juskey*, and *Pu*, and in further view of *Roh*.

Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

Claim 20 depends from independent claim 11, incorporating its features. Therefore, for at least the same reasons that claim 11 is patentable over *Pu, Solberg, and Juskey* or over *Isaak, Solberg, Juskey, and Pu*, claim 20 is patentable over *Pu, Solberg, and Juskey* or over *Isaak, Solberg, Juskey, and Pu*. Further, the deficiencies of *Pu, Solberg, and Juskey* or *Isaak, Solberg, Juskey, and Pu*, as described above as they related to claim 11 are not overcome by the teachings of *Roh*. For at least this reason, claim 20 is patentable over *Pu, Solberg, and Juskey* or over *Isaak, Solberg, Juskey, and Pu*, and in further view of *Roh*.

Claims 22-25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pu and Juskey* or over *Isaak, Juskey, and Pu*, and in further view of U.S. Patent No. 5,145,303 to John R. Clarke ("*Clarke*"). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

Claims 22-25 depend from independent claim 21, incorporating its features. The deficiencies of *Pu and Juskey* or *Isaak, Juskey, and Pu* as described above as they related to claim 21 are not overcome by the teachings of *Clarke*. For at least this reason, claims 22-25 are patentable over *Pu and Juskey* or over *Isaak, Juskey, and Pu*, and in further view of *Clarke*.

**Conclusion**

In view of the foregoing, Applicant submits that claims 1-4, 7-14, and 17-27 are in condition of allowance. Early issuance of Notice of Allowance is respectfully requested. The Examiner is encouraged to telephone the undersigned if there are any remaining questions of patentability, and a telephone interview would be helpful in resolving these questions.

The Commissioner is hereby authorized to charge shortages or credit overpayments to Deposit Account No. 500393.


Respectfully submitted,

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Dated: \_\_\_\_\_

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